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Kenya

Biotechnology

Modern Agricultural Biotechnology

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Report Highlights:
Kenya has developed a significant capacity for agricultural biotechnology research and development. Despite the lack of clear-cut biosafety and biotechnology policies, the government of Kenya has permitted field-testing of genetically modified plant materials.

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Executive Summary

Kenya has developed a significant capacity for agricultural biotechnology research and development. Despite the lack of clear-cut biosafety and biotechnology policies, the government of Kenya has permitted field-testing of genetically modified plant materials.

Field trials for the transgenic sweet potato, Bt. corn, Bt. cotton and trials for a double recombinant Rinderpest vaccine have been approved.

Efforts are underway to develop biosafety and biotechnology policy and legislation.

Overview of Modern Agricultural Biotechnology in Kenya

The Government of Kenya (GOK) recognizes biotechnology as one of the tools to enhance human welfare in matters related to health care, food security and poverty alleviation. Kenya has adequate capacity for production of first and second-generation agricultural biotechnology products and has commercialized products of fermentation (beer, yeast for baking, enzymes for food production etc.) and tissue culture (pyrethrum, cut flowers, tea, coffee and bananas) respectively. The GOK realizes and appreciates the benefits of modern biotechnology, but has taken a "pre-cautionary approach"; applying biotechnology cautiously to safeguard against undesirable consequences on human health and the environment.

Modern biotechnology or genetic engineering (third-generation biotechnology) is at field testing stage. Monsanto Company, in collaboration with Kenya Agricultural Research Institute (KARI), has carried out field tests on transgenic sweet potatoes (CPT560) developed for resistance to feathery mottle virus that normally wipes out 80% of the crop. The results were modest and not significantly different from the conventionally bred sweet potato, indicating a need for further research. The testing made it possible for the GOK to revise the biosafety guidelines and acknowledge the need for a biotechnology policy. Further research on the sweet potato project is on going at the Donald Danforth Plant Science Center, Missouri after a transfer agreement with Monsanto Company (developer and owner of the technology) from KARI.

Several modern agricultural biotechnology research projects are currently underway:

- Field testing on Bt corn for insect resistance is ongoing; a collaborative research between KARI, the International Research Center for Maize and Wheat (CIMMYT) and Sygenta Company.
- Transgenic cassava field trials in western Kenya are expected to take-off later this year or early 2004, a collaborative effort between Donald Danforth Plant Science Center and KARI.
- Pest resistance Bt Cotton has been approved for field trials but the import permit is yet to be issued by Kenya Plant Health Inspectorate Service (KEPHIS).
- The International Livestock Research Institute (ILRI) in collaboration with KARI and the Ministry of Agriculture are working on animal disease diagnostics (Contagious Bovine

Pleuropneumonia, Rift Valley Fever, Lumpy Skin, Foot and Mouth, Heart water and New Castle disease) vaccines.

- The University of California Davis together with KARI National Veterinary Research Center in Muguga have developed recombinant rinderpest vaccine.

Developers of the Technology

KARI takes the lead on agricultural biotechnology research and development, working in collaboration with international organizations (International Research Center for Maize and Wheat (CIMMYT), International Livestock Research Institute(ILRI) and World Agroforestry Organization), private companies like Monsanto, Sygenta etc. and universities (Jomo Kenyatta University of Agriculture and Technology, Kenyatta, Moi and University of Nairobi).

Regulatory Framework

Background

The National Council for Science and Technology (NCST) started addressing biosafety issues in 1993 with support from Netherlands government. In November 1996, the Convention on Biological Diversity (CBD) provided financial resources through United Nations Environmental Program - Global Environmental Facility (UNEP-GEF) for capacity building in biosafety for developing countries. It was recognized that society can only benefit from biotechnology if adequate biosafety mechanisms are in place. The two main components in the GEF strategy are facilitation in the development of national biosafety frameworks in over 100 countries and assistance in the implementation of the frameworks starting with demonstration projects in 12 countries, including Kenya.

On a national level the target of the project is to have the main components of the national biosafety framework operational at the end of the project. The components of the national biosafety framework are:

- Clear policy on biosafety and biotechnology.
- Biotechnology and Biosafety Bill.
- Regulatory regime – due to requirements of permits for certain activities.
- System to handle requests.
- Monitoring and inspections.
- Public information.

National Biosafety Regulations and Guidelines

The NCST, within the Ministry of Education, Science and Technology is responsible for regulating any technological development bound by the Science and Technology Act. The Act has over 25 laws touching on agriculture, which are currently under review. The national biosafety regulations and guidelines first issued in 1998 enabled the establishment of the National Biosafety Committee (NBC) and provided guidelines for the establishment of Institutional Biosafety Committees (IBC). NBC is made up of the regulatory bodies, research and development institutions, representatives of key

government ministries (Agriculture, Health, Trade and Industry, Education, Environment and Natural Resources) and non-governmental organizations promoting biotechnology. The guidelines and committees have been used in the approval of field trials for the transgenic sweet potato, Bt. corn, Bt. cotton and trials for a double recombinant Rinderpest vaccine. However, the biosafety regulations and guidelines are not legal instruments, as they are not backed by an Act of Parliament.

Standards

Kenya Plant Health Inspectorate Service (KEPHIS) and the Department of Veterinary Sciences (DVS) are the regulatory institutions dealing with sanitary and phytosanitary issues. They are supposed to align their policies to incorporate biotechnology, specifically in areas of improvement of genetic quality, increased productivity and conservation of genetic diversity.

Kenya Bureau of Standards (KEBS) is the regulatory institution charged with the responsibility for developing standards. It has developed standards pertaining to various products to ensure safety for human consumption. Currently, no standards are available for products of modern biotechnology. Capacity to develop the standards and to enforce their adherence is low.

Established in mid 2002, the National Environmental Management Authority (NEMA) is the regulatory body entrusted with environmental protection. However, it, too, has limited institutional capacity.

International Context

Biotechnology development in Kenya is taking place within the context of international agreements to which Kenya is party. Kenya is a member of the Codex Alimentarius Commission and has signed the Cartagena Protocol on Biosafety (May 2002), which requires member countries to develop biotechnology in a manner consistent with conservation and sustainable use of biological resources. Kenya is also a member of the International Convention for the Protection of New Varieties of Plants (UPOV Convention). This should inform policy directions in biotechnology research and development and also international participation in biotechnology entrepreneurship.

Public Awareness

GOK has encouraged dissemination of accurate, complete and balanced information on agricultural biotechnology to the public. Several non-governmental organizations have been formed to create awareness and promote biotechnology. The African Biotechnology Stakeholders Forum (ABSF) has spearheaded the outreach programs. Others include International Service for Acquisition of agri-biotech Applications(ISAAA), Biotechnology Trust Africa (BTA), A Harvest Biotechnology Foundation International (headed by Dr. Florence Wambugu, former Director of ISAAA and lead scientist in the transgenic sweet potato project) and the print media (the three leading daily newspapers, Biosafety News Magazine etc.).

Challenges of Agricultural Biotechnology Development in Kenya

- **$** Limited infrastructure (facilities like modern greenhouses, testing equipment, machinery etc.).
- Limited capacity in monitoring and inspection capabilities, patent attorneys, journalists and research scientists.
- Funding - investment in research and development by the government and private sector is limited. Only a very small part is government financed, with the rest provided by donors.
- The Public-Private sector partnership concept is not well developed.
- Prioritization of the projects, e.g. food security crops or those with economic leverage.
- Public perceptions and involvement-educating and creating awareness to farmers, policy makers, consumers and all other stakeholders. There are many myths surrounding agricultural biotechnology ranging from ethics and religious issues, labeling to truth in marketing.

Conclusion

Since 1998, the GOK has issued regulations and guidelines bound by the Science and Technology Act. Efforts are underway to develop a biotechnology and biosafety policy and regulations with assistance from inter alia UNEP - GEF Project, UNIDO, The Rockefeller Foundation and USAID. Bills on biosafety and biotechnology are out for discussions by stakeholders.